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Short Communication

Mating of the Amazon racerunner (*Ameiva praesignis*) (Squamata, Teiidae) in Panama

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Abstract

Polygyny is common among lizards, and sexual dimorphism in coloration and size influences sexual selection by females. Courtship and copulation include ritualized behaviors such as chasing, cloacal rubbing, and head bobbing, observed especially in the family Teiidae. *Ameiva praesignis*, a diurnal Neotropical lizard, inhabits various terrestrial habitats in Central America, and juveniles have bright blue tails that they lose as they mature. During a mating event, the male and female were observed to remain motionless during copulation, followed by a dominant posture by the male, while another smaller male watched them without intervening. This behavior suggests that males guard females to reduce competition and increase reproductive success. Marked sexual dimorphism was noted, with larger, more corpulent males and intense coloration. The courtship and mating behaviors of *A. praesignis* are like those of *A. ameiva*, perhaps suggesting that they are characters that are fixed at the genus level. Although mating events are common, in some species they are poorly documented, highlighting the influence of size and coloration on sexual selection.

Key words: competition, courtship, ethology, reproduction, sexual dimorphism, territoriality

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Introduction

A wide variety of behaviors have been documented regarding courtship and mating events in lizards (Moraes and Oliveira 2021). Among these lizard mating systems, polygamy is the most common, and sexual dimorphism in coloration and size is closely related to female sexual selection (Pianka and Vitt 2003; Ramalho et al. 2021). Courtship and copulation in lizards involve generally a series of ritualized behaviors (Costa et al. 2010; Ribeiro et al. 2011). In the case of the family Teiidae, behaviors such as chasing, cloacal rubbing, and head movements have been described (Sales and Freire 2021). Males often actively seek out females, and mate guarding after copulation seems to be common in teiids, reducing the opportunity for females to mate with other males (Bull 2000; Ramalho et al. 2021).

Within the Teiidae family, the genus *Ameiva* includes 14 described species (Sanches et al. 2021). Elevated to species status by Ugueto and Harvey (2011), *Ameiva praesignis* (Baird & Girard, 1852) is a medium-sized neotropical lizard, belonging to the *A. ameiva* group (Harvey et al. 2012). They are diurnal, with active feeding habits, and are found in a wide variety of terrestrial habitats, including forests, small clearings, and disturbed areas in South America (Harvey et al. 2012), Panama (Echternacht 1971), and southwestern Costa Rica (Savage 2002). In this work, I report for the first time in Panama a mating event of *A. praesignis* and compare it with the already known mating behavior of its congener, *A. ameiva*.

Methods

This observation occurred on 28 May 2024, at 1117 h, in the community of Cáceres (8°56'31"N, 79°40'47"W), Arraiján, in the province of Panamá Oeste, Panama. The community of Cáceres is characterized by its high population density and vegetation remnants, most of which show some degree of contamination. The event was documented through 14 photographs and three videos using a CANON Powershot SX70HS camera from approximately five meters between the observer and the event, in the presence of four people who were working in the area.

Ameiva praesignis is the only species of the genus reported for Panama following its taxonomic separation by Ugueto and Harvey (2011), who provided the distinguishing characteristics for this species: adult male coloration gray, bluish-gray, or gray-brown; pale lateral ocelli; adults with a cream or blue throat; a distinctive light or yellowish vertebral stripe often present, or ocelli present on the dorsum (Fig. 1A, B, C, Male); juvenile males with a pale dorsolateral stripe bordering the upper margin of a wide black lateral stripe or paired black spots on the dorsum; a pale vertebral stripe often present (Fig. 1D, Juvenile Male); juvenile females with a pale throat and a pale vertebral stripe or spots often on the dorsum (Fig. 1A, B, C, Female).

Results

I started observing mating behavior when the male was on top of the female, with his left front and rear limbs on it, and keeping the female´s tail raised (Fig. 1A) remaining motionless for approximately 30 seconds. In this position, the male keeps his body arched and partially rotated, which seems to facilitate copulation (Fig. 1B, C). After approximately three minutes, the female was released. The female moved, and the male followed her, adopting a visibly dominant posture, with the first third of his body arched, appearing larger and more corpulent. The male made up-and-down head movements and exhibited slight vibrations or spasms in his pelvic girdle and hind limbs, which he partially dragged while pursuing the female. The female entered a hole, and the male guarded it for 90 seconds. Then, the female exited and entered another hole where she stayed for a little over two minutes, after which both left the area. The pair was not collected; however, I estimated that the male and female measured (SVL) 220 mm and 160 mm, respectively. The entire process was observed by another smaller male, approximately 170 mm (SVL), who was 1.5

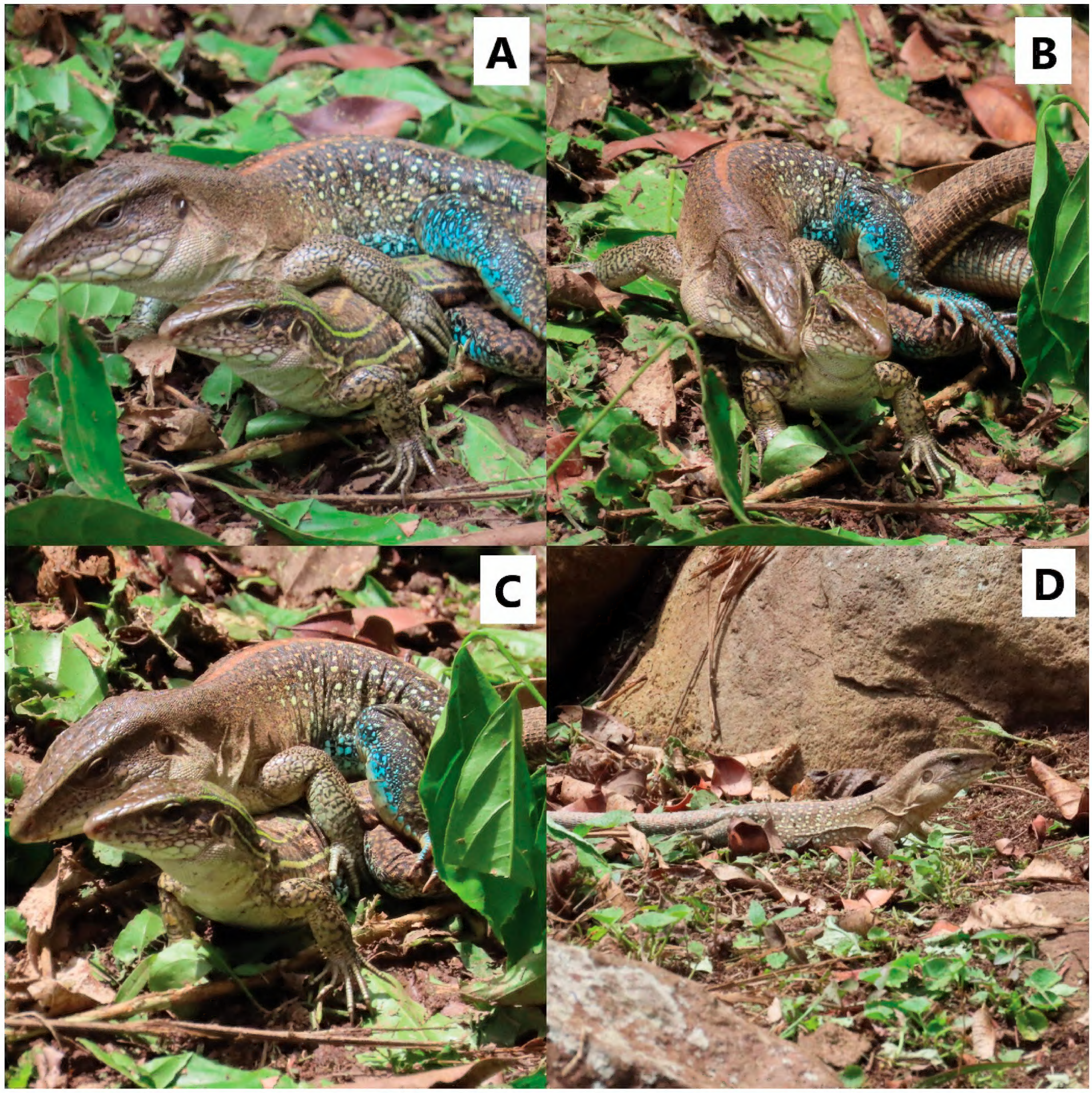

Figure 1. Mating event of *Ameiva praesignis* observed in the community of Cáceres, Arraiján, province of Panamá Oeste, Panama **A** both individuals were motionless **B** the male on top of the female, who kept her tail raised **C** thus, allowing copulation by the male who kept his body arched and partially rotated **D** another smaller male.

meters away (Fig. 1D). This latter male did not intervene in the mating and left once the pair approached the second hole. The event lasted for a total of about seven minutes (Video at https://youtu.be/iJzJi_Lh3VI?si=IiYbc8QfJpR5QQ9F).

Discussion

Ugueto and Harvey (2011) published a photograph of a pair of *A. praesignis* during mating; however, they did not provide a description of the event. Therefore, this study is the first to describe the mating behavior of this species, which closely resembles that observed in *Ameiva ameiva* (Manata and Nascimento 2005; Ramalho et al. 2021). For example, as was observed for *Ameiva ameiva*,

males of *A. praesignis* also display head movements, chasing, and cloacal rubbing against the ground during mating. Additionally, I also observed male guarding behavior of the female, suggesting that by protecting the female as much as possible, males reduce the opportunity for rival males to access the female, potentially increasing their reproductive success. These behavioral similarities are expected, since such species are phylogenetically related (Harvey et al. 2012).

Similar to what was observed in *A. ameiva* (Ramalho et al. 2021), I also noted marked sexual dimorphism in *A. praesignis*, since the male is considerably larger and more robust than the female and exhibits a morphotype with an intense turquoise coloration in the inguinal and ventral regions. Although males of *A. praesignis* are significantly longer and have relatively longer heads compared to females (Ugueto and Harvey 2011), the literature does not provide information on the body size that indicates sexual maturity in this species. Based on a comparison of the data presented here with those provided by Colli (1991), I suggest that the three individuals described are sexually mature and fully capable of reproduction.

Finally, this observation was made in an open area in a populated zone like some of the habitat types proposed by Harvey et al. (2012). There were even people working and neighbors' pets near the event, which continued without disturbances. Mating events are relatively common, however, in some species they have been poorly documented; characteristics such as size and coloration represent a visible sexual dimorphism, which influences sexual selection by the female.

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Additional information

Conflict of interest

The author has declared that no competing interests exist.

Ethical statement

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Author contributions

The author solely contributed to this work.

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Data availability

All of the data that support the findings of this study are available in the main text.

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